

## **Memo**



**Stantec**

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To:	Paul Koleda	From:	Chris Elenbaas
	MDNRE		Stantec Consulting Michigan
	Revolving Loan and Operator		Inc.
	Certification Section		
File:	2075098703	Date:	April 29, 2010

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**Reference: Charter Township of Northville - Project No. 7299-01  
Green Project Reserve Funding Business Case**

The purpose of this memo is to document the eligibility of the Charter Township of Northville DWRP Project No. 7299-01 for Green Project Reserve funding under the ARRA. This project proposes to replace 6,800 feet of cast iron water main that is 60 to 70 years old and ranges from 10" to 12" in diameter. The water main will be replaced with sections of water main ranging from 8" to 16". The project also includes the replacement of existing pumps at the Beck Road Booster Station. The following information is provided to document the Township's eligibility.

The water main of concern is the only cast iron pipe within Northville Township's water system and was originally installed in the 1940's as part of the City of Plymouth's distribution system. When it was installed, none of the current roads through the area had been constructed and the water main followed the Johnson Creek.

Currently much of the existing water main is located in areas that are extremely difficult to access, as the Creek and its surrounding wetlands have become protected wildlife areas. Due to accessibility issues and the vicinity to the creek and wetlands, a major leak or break in the water main could go unnoticed for an extended period. Additionally, once the break or leak is discovered, the water main will be difficult to access and repair, resulting in considerable downtime and additional water loss.

The Township's records indicate that this section of water main had seven (7) water main breaks during the period from 1983 to 1996. Although no breaks have occurred in the past ten years, based on prior history and the continued aging of the water main it is likely that future breaks will occur at a rate of 0.40 breaks/mile/ year. Due to the remote location of the water mains, these breaks will result in an increased water loss. It is estimated that each break will result in a total water loss of approximately 5,040,000 gallons. This will result in an annual water loss of approximately 2,016,000 gallons due to water main breaks. These losses are much larger than would potentially occur if the water main were located along an accessible route.

Based on the Northville Township 2006 Water System Update Report, the Township is proposing multiple sections of 8" to 16" water main to replace the existing cast iron

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Green Project Reserve Funding**

main. The water main will be properly sized to maintain adequate pressure on the suction side of the Beck Road Booster Station. Furthermore, the proposed project will relocate the water main along existing roads, resulting in increased access for maintenance and repair. To maximize the useful life, the new mains will be either ductile iron pipe wrapped in polyethylene or HDPE pipe.

The Township will realize a reduction in electricity use at the Beck Road Booster Station due to the proposed improvements. Based on the existing calibrated water system model, it is estimated that there will be an energy savings from pumping water through the new mains versus the old ones of 13,490 KWH per year. This results from the increased "C" Factor along the route, as well as the redundant and properly sized water mains that will now feed from the DWSD meter pit into the suction side of the Beck Road Booster Station.

*Pump  
feeder  
in the pit*

The water main replacement will eliminate the potential for remote water main breaks/leaks that could go undetectable for an extended period and cause considerable water loss. Additionally, the proposed improvements will result in considerable energy savings due to increased C factors and properly sized water mains. Based on this data, it is our opinion that the Township should be eligible for DWRF Green Project Reserve funding under the ARRA.

**STANTEC CONSULTING MICHIGAN INC.**



Chris Elenbaas  
Project Engineer  
chris.elenbaas@stantec.com

Attachment: Green Project Reserve Qualification Template

c. Don Weaver, Northville Township  
Dima El-Gamal, Stantec

**Drinking Water Revolving Fund  
Green Project Reserve Qualification Template**

Applicant: Charter Township of Northville Project No: 7299-01  
Project Name: Beck Road Pump Station District Water System Improvements

Identify by page number from the project plan, or attach excerpts, where water efficiency or energy efficiency improvement justification is provided or discussed to support the need for the recommended green project reserve component: Pages See Attached.

Please ensure all requested information is provided to enable an assessment by the Michigan Department of Natural Resources and Environment (DNRE) of whether the project or project component can qualify for funding from the green project reserve.

**Water Main Replacement**

1. Over the last ten years, 0\* water main breaks have occurred on the water mains that are proposed for replacement, an average of 0\* breaks/mile/year.  
\*During the period from 1983 to 1996, a total of 7 water main breaks occurred on the water main proposed for replacement. Based on this previous history, it is assumed that breaks will occur at an average of 0.40 breaks/mile/year in the next 20 years.
2. Identify the length, diameter, age and type of pipe to be replaced:  
The Township will be replacing 6,500 feet of 10" cast iron water main that was constructed in the 1940's and 3,300 feet of 12" cast iron water main that was constructed during the 1940's. The proposed water main will be relocated along existing roadways as shown in the project plan and has been sized properly according to the Township's 2006 Water System Update Report.
3. Each break is estimated to result in the average loss of 5,040,000 gallons of water, calculated to total 2,016,000 gallons/year of water lost for those water mains.
4. Present the data indicating how this is a significant source of water loss in the system and how the pipes proposed for replacement are likely to generate the greatest return in leak reduction.  
The existing water main was installed in the 1940's along the route of the Johnson Creek. Currently much of the existing water main is located in areas that are extremely difficult to access, as the Creek and its surrounding wetlands have become protected wildlife areas. Due to accessibility issues and the vicinity to the creek and wetlands, any major leak or break in the water main will potentially go unnoticed for an extended period. Additionally, once discovered, the water main will be difficult to access and repair, resulting in considerable downtime and additional water loss. The proposed project will relocate the water main along existing roads, resulting in increased access for maintenance and repair.
5. The energy savings from pumping/delivering water through the new water mains versus the old ones is estimated at 13,490 KWH/year.

6. Describe the condition of the replaced mains with respect to friction/head loss etc from tuberculation or other deterioration issues. As appropriate, identify if the soils are corrosive and contributing to the deterioration/breaks or leaks in the mains, and how the replacement mains are designed to address future corrosion:

Tuberculation has not been a concern since the water main has been used as a transmission main and the high flows have prevented the accumulation of tuberculation. Corrosion issues have not been prevalent along the existing water main. Utilizing AWWA C105, Appendix A, the soil borings taken for the proposed water main were analyzed for corrosive properties. It was determined that the soil properties are generally not corrosive. However, these soil borings were not taken in the exact location as the existing water main and conditions could vary. Due to the location of existing water main near the Johnson Creek and its associated wetlands, the possibility that the soils are corrosive is increased.

7. Total project cost for the water main replacement component of the project is \$1,595,600.

8. Identify the source of data used for these calculations.

Water main break data was determined from Northville Township's water main break records. Assumptions were made to quantify the amount of water lost during a water main break event based on previous water main break experience and the remote location of the existing main. The potential energy savings are based on values from the Northville Township 2006 Water System Update Report and associated H20Net water model.

Submitted by:

<u>Chris Elenbaas</u>	<u>4/29/10</u>
Name	Date

<u>Project Engineer</u>
Title

## **Transmittal**



**Stantec**

**Stantec Consulting Michigan Inc.**  
3959 Research Park Drive  
Ann Arbor MI 48108-2216  
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To: Paul Koleda  
Company: MDNRE  
Address: Revolving Loan and Operator  
Certification Section  
Constitution Hall, 3 South  
525 W. Allegan Street  
Lansing, Michigan 48933  
Phone:  
Date: April 29, 2010  
File: 2075098703  
Delivery: E-mail and Fed Ex

From: Chris Elenbaas  
☒ For Your Information  
☐ For Your Approval  
☐ For Your Review  
☐ As Requested

**RECEIVED**  
APR 30 2010  
WATER BUREAU  
RLOC

**Reference: Charter Township of Northville - DWRP Project No. 7299-01  
Green Reserve Business Case**

**Attachment:**

Copies	Doc Date	Pages	Description
1	4/29/10	2	Green Project Reserve Funding Business Case Memo
1	4/29/10	2	Green Project Reserve Qualification Template

Please find attached the green reserve supplemental documents for Northville Township's DWRP Project Plan No. 7299-01

**STANTEC CONSULTING MICHIGAN INC.**

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Project Engineer  
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c. Don Weaver, Northville Township  
Dima El-Gamal, Stantec

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**Koleda, Paul (DNRE)**

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**From:** Donaldson, Kristina (DNRE)  
**Sent:** Thursday, May 13, 2010 10:33 AM  
**To:** Koleda, Paul (DNRE)  
**Subject:** Northville Twp GPR Review

Paul,

I have reviewed the Green Project Reserve Business Case for the Northville Twp DWRF Project No. 7299-01. I concur that the business case supports green project reserve eligibility.

Thanks,

Kris Donaldson, P.E.  
Environmental Engineer  
Michigan Department of Natural Resources & Environment  
Southeast Michigan District Office  
27700 Donald Court  
Warren, MI 48092  
ph: 586-753-3759  
fax: 586-753-3751

5/14/2010